COURSE OUTCOME B.Sc. MATHEMATICS

University link for B.Sc. Mathematics syllabus - http://docs.uoc.ac.in/website/syllabus/2021-09-15%2013:31:08_syl1212.pdf

Course learning outcomes

CORE COURSES													
Programme outcomes	Basic Logic and Number Theory	Calculus of Single Variable – 1	Calculus of Single Variable – 2	Linear Algebra	Abstract Algebra	Basic Analysis	Numerical Analysis	Linear Programming	Introduction to Geometry and Theory of Equations	Real Analysis	Complex Analysis	Calculus of Multi variable	Differential Equations
Disciplinary knowledge	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Communication skills	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Critical thinking	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Analytical thinking	✓	✓	✓			✓				✓	✓	✓	
Problem solving	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Research related skills	✓		✓	✓			✓		✓	✓	✓		✓
Information/ Digital Literacy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Self-directed learning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lifelong learning	✓			✓		✓				✓			
Applicational skills	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Experimental learning	✓	✓	✓				✓	✓					✓
Employability options	✓			✓			✓	✓				✓	✓
Ethics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

COURSE OUTCOME:

Sl No	Name of the paper	Course Code	Course outcome
1	Basic Logic and Number Theory	MTS1B01	Prove results involving divisibility, greatest common divisor, least common multiple and a few applications •Understand the theory and method of solutions of LDE. •Understand the theory of congruence and a few applications. •Solve linear congruent equations. •Learn three classical theorems viz. Wilson's theorem, Fermat's little theorem and Euler's theorem and a few important consequences
2	Calculus of Single variable-1	MTS2B02	Lays the foundation of Differential and Integral Calculus
3	Calculus of Single variable-2	MTS3B03	•Enable the students to handle vectors in dealing with the problems involving geometry of lines, curves, planes and surfaces in space •Acquire the ability to sketch curves in plane and space given in vector valued form
4	Linear Algebra	MTS4B04	•This course gives the students an opportunity to learn the fundamentals of linear algebra by capturing the ideas geometrically, by justifying them algebraically and by preparing them to apply it in several different fields such as data communication, computer graphics, modelling etc.
5	Theory of Equations and Abstract Algebra	MTS5B05	•Idea about polynomial equations and methods of finding their algebraic solution or solution by radicals. Introduces basic ideas and results of abstract algebra.
6	Basic Analysis	MTS5B06	•the learning will help them to appreciate the beauty of logical arguments and embolden them to apply it in similar and unknown problems •Learns about sequences, their limits, several basic and important theorems involving sequences and their applications. •get a rigorous introduction to algebraic, geometric and topological structures of complex number system, functions of complex variable, their limit and continuity

7	Numerical Analysis	MTS5B07	•Understand several methods to find out the approximate numerical solutions of algebraic and transcendental equations with desired accuracy. •Understand the concept of interpolation and also learn some well-known interpolation techniques. •Understand a few techniques for numerical differentiation and integration and also realize their merits and demerits. •Find out numerical approximations to solutions of initial value problems and also to understand the efficiency of various methods
8	Linear Programming	MTS5B08	•Solve linear programming problems geometrically •Understand the drawbacks of geometric methods •Solve LP problems more effectively •Understand duality theory •Understand game theory
9	Introduction to Geometry	MTS5B09	•Recognize and classify conics. •Understand Kleinian view of Euclidean geometry •Understand affine transformations, the inherent group structure, the idea of parallel projections and the basic properties of parallel projections. •Understand the fundamental theorem of affine geometry •Understand which conics are affine-congruent to each other •Realize the basic difference in identifying two geometric objects in Euclidean and affine geometries. •Understand Kleinian view of projective geometry
10	Project		
11	Real Analysis	MTS6B10	•Understand several deep and fundamental results of continuous functions •Realize the difference between continuity and uniform continuity •Understand the significance of uniform continuity in continuous extension theorem. •Develop the notion of Riemann integrability of a function using the idea of tagged partitions and calculate the integral value of some simple functions using the definition. •Understand a few basic and fundamental results of integration theory.
12	Complex Analysis	MTS6B11	•Understand the difference between differentiability and analyticity of a complex function and construct examples. •To know of harmonic functions and their connection with analytic functions •To know a few elementary analytic functions of complex analysis and their properties

			• To understand definition of complex integral, its properties and evaluation. • To know a few fundamental results on contour integration theory such as Cauchy's theorem, Cauchy-Goursat theorem and their applications. .• To know a more general type of series expansion analogous to power series expansion viz. Laurent's series expansion for functions having singularity. • To see another application of residue theory in locating the region of zeros of an analytic function
13	Calculus of Multi variable	MTS6B12	• Understand several contexts of appearance of multivariable functions and their representation using graph and contour diagrams. • Formulate and work on the idea of limit and continuity for functions of several variables. • Understand the notion of partial derivative, their computation and interpretation • Get the idea of directional derivative, its evaluation, interpretation, and relationship with partial derivatives • Calculate the maximum and minimum values of a multivariable function using second derivative test and Lagrange multiplier method • Extend the notion of integral of a function of single variable to integral of functions of two and three variables. • Address the practical problem of evaluation of double and triple integral using Fubini's theorem and change of variable formula. • Realise the advantage of choosing other coordinate systems such as polar, spherical, cylindrical etc. in the evaluation of double and triple integrals. • See a few applications of double and triple integral in the problem of finding out surface area ,mass of lamina, volume, centre of mass and so on • Learn three major results viz.Green's theorem, Gauss's theorem and Stokes' theorem of multivariable calculus and their use in several areas and directions
14	Differential Equations	MTS6B13	• Students could identify a number of areas where the modelling process results in a differential equation • They will learn to solve DEs that are in linear, separable and in exact forms and also to analyse the solution • They will learn a method to approximate the solution successively of a first order IVP. • They will become familiar with the theory and method of solving a second order linear homogeneous and nonhomogeneous equation with constant coefficients.

			• They will learn to find out a series solution for homogeneous equations with variable coefficients near ordinary points. • Students acquire the knowledge of solving a differential equation using Laplace method which is especially suitable to deal with problems arising in engineering field. • Students learn the technique of solving partial differential equations using the method of separation of variables
15.	Graph theory	MTS6B14 (E01) (Elective)	• They will learn basics of Graph theory • Bridges Spanning Trees, Euler Tour, Hamiltonian Graphs Plane and Planar graphs Euler's Formula
16.	Project Viva	MTS6P15(PR)	To Promote independent study and research in new areas